

PROJECT SHEET

NY INSEGLINGSRÄNNA GÄVLE (PORT OF GÄVLE, SWEDEN)
PORT EXTENSION AND UPGRADING NAVIGATION AIDS

PROJECT DESCRIPTION

The Port of Gävle is located on the east coast of Sweden in the Gulf of Bothnia, facilitating Swedish imports and exports. The client wished to improve maritime safety and accessibility, and to increase the throughput of goods in this harbor. The Swedish Maritime Administration awarded Boskalis Sweden AB the contract to achieve these objectives by widening and deepening of the approach to the Port of Gävle and upgrading the navigation aids.

The following works were performed:

Environmental dredging

The grab dredger Kahmari 2 removed a layer of precisely 0.5 m over an area of 1,000,000 m² using her specially designed environmental Horizontal Profiling Grab. The material was loaded into barges and delivered to a quay wall in Gävle, where Gävle Hamn unloaded the barges, stabilized the material and used it for reclamation.

Capital dredging

- The backhoes Nordic Giant & Wodan dredged 1 million m³ of hard material. This material varied from gravel & sand (with a lot of stones/boulders), to moraine (both dense and very dense) and rock, which was pre-treated by drilling & blasting.
- The trailer suction hopper dredgers Crestway, Shoalway and Shoreway dredged 2.5 million m³ of soft material (silt with an organic content) and gravel & sand.
- All materials dredged by the backhoes and trailer suction hopper dredgers were taken to a designated area a few kilometres offshore at a depth of -34 m.

FEATURES

Client	Swedish Maritime Administration
Location	Gävle Hamn, Sweden
Period	September 2012 – June 2014
Contractor	Boskalis Sweden AB



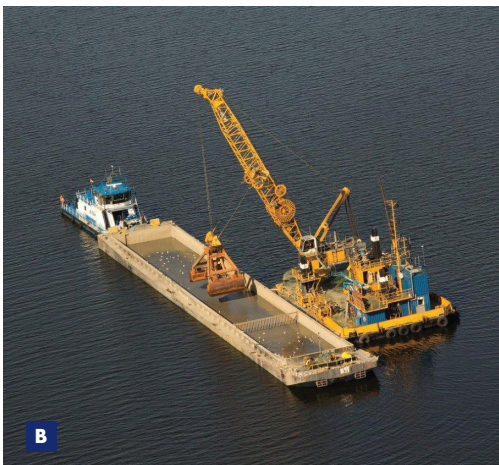
- A Location map
- B Environmental dredging by grab Kahmari
- B Nordic Giant and Wodan working side by side

Drilling & blasting

Boskalis Terramare, the Boskalis in-house drilling & blasting specialist, deployed their specialized pontoon Playmate to pre-treat several rock layers before the channel could be dredged to its final depth.

Construction of lighthouses

Boskalis Terramare proposed a completely new concept for the two new lighthouse structures to be realized for the project. Using pre-fabricated steel components instead of the widely-used concrete structures has the advantage of less weight and this makes handling during the installation phase easier, without compromising the required final strength of the structure. The engineering phase was completed successfully in partnership with the client,



B



C

after which the pre-fabricated components were produced at a shipyard in Finland and transported overseas to the project in Sweden. In Gävle, the Boskalis Terramare specialists placed the components carefully in the prepared positions on the sea bed using the 200 t floating crane Nosto-Pekka, weighted down the structures with concrete, placed scour protection, and finally fitted the lighthouses with ice-resistant top-sides to withstand the frequently harsh ice conditions in the Baltic Sea.

Repair of existing lighthouse

Repairs involving diving and underwater concreting works were required due to the undermining of one of the existing old lighthouses.

Removal of an existing lighthouse

Due to the widening of the vessel traffic channel (from a width of 50 m to 125 m), an old lighthouse had to be removed. This was done using drilling & blasting, after which the debris was dredged out.

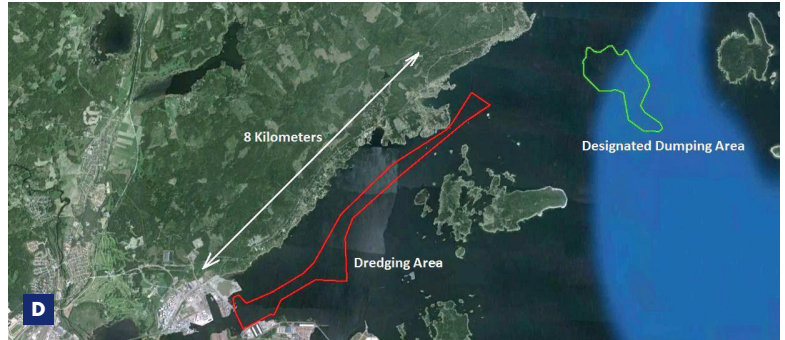
A wide range of vessels (including Boskalis-owned vessels) were used for the completion of the project:

- Three different trailer suction hopper dredgers
- Four different backhoes with eight self-propelled split hopper barges
- One grab dredger with several barges
- One drilling & blasting pontoon
- Several ploughing vessels
- Multibeam survey vessel
- One floating crane, several flat top barges and further auxiliary equipment for the installation of the lighthouses

PROBLEM SOLVING

The main challenge in the project was to get the best possible information about all the different

NY INSEGLINGSRÄNNA GÄVLE (PORT OF GÄVLE, SWEDEN) PORT EXTENSION AND UPGRADING NAVIGATION AIDS



soil layers in the capital dredging areas. Different types of dredger have to be used in the different soil types to work as efficiently as possible. Additional soil investigations were conducted and soil modeling by the specialists in the Boskalis soil & production departments maximized the efficiency of the planning and execution of the project.

PROJECT HIGHLIGHTS

- Innovative lighthouse structures were designed, constructed and placed during the project.
- Up to ten vibration monitoring devices to log the actual vibrations during each and every of the underwater blasts made safe and efficient blasting close to 61 properties possible.
- Hydronamic was involved, together with the client, in establishing an extensive turbidity monitoring program to minimize the impact on the environment. Several thousand water samples were tested, none of which resulted in any interruptions to the works, mainly due to the use of the specially designed environmental grab, which reduces the release of suspended solids during the excavation of the seabed material and therefore limits the potential for the spread of any potentially contaminated material.
- 150 boulders > 5 m³ were dredged
- The harsh Baltic weather conditions forced us to interrupt the work on two occasions.
- 500,000 m³ of contaminated material was dredged and separated from the open environment carefully.
- And last but not least: there were no major accidents during the project!



- D** Gävle overview picture
- E** Drilling & blasting works
- F** Repair bucket Kahmari

Royal Boskalis Westminster N.V.
PO Box 43
3350 AA Papendrecht
The Netherlands
T +31 78 69 69 000
F +31 78 69 69 555
royal@boskalis.com
www.boskalis.com